

## **ABSTRACT**

A control system for an array of qubits is disclosed. The control system according to the present invention provides currents and voltages to qubits in the array of qubits in order to perform functions on the qubit. The functions that the control system can perform include read out, initialization, and entanglement. The state of a qubit can be determined by grounding the qubit, applying a current across the qubit, measuring the resulting potential drop across the qubit, and interpreting the potential drop as a state of the qubit. A qubit can be initialized by grounding the qubit and applying a current across the qubit in a selected direction for a time sufficient that the quantum state of the qubit can relax into the selected state. In some embodiments, the qubit can be initialized by grounding the qubit and applying a current across the qubit in a selected direction and then ramping the current to zero in order that the state of the qubit relaxes into the selected state. The states of two qubits can be entangled by coupling the two qubits through a switch. In some embodiments, the switch that is capable of grounding the qubits can also be utilized for entangling selected qubits.